

# Special Publication 368

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## ELECTRICAL ENGINEERING UNITS AND CONSTANTS

Units and Symbols				
Quantity	Symbol	Unit	Symbol	Identical Unit
current	I	ampere	A	
charge	Q	coulomb	C	A · s
voltage, potential	V	volt	V	W/A
energy, work	W	joule	J	N · m
power	P	watt	W	J/s
resistance	R	ohm	Ω	V/A
conductance	G	siemens	S	A/V
resistivity	ρ	ohm-metre	Ω · m	
conductivity	σ	siemens per metre	S/m	
reactance	X	ohm	Ω	V/A
susceptance	B	siemens	S	A/V
impedance	Z	ohm	Ω	V/A
admittance	Y	siemens	S	A/V
capacitance	C	farad	F	C/V
inductance	L	henry	H	Wb/A
electric flux density	D	coulomb per square metre	C/m²	
electric field strength	E	volt per metre	V/m	
permittivity	ε	farad per metre	F/m	
relative permittivity	ε <sub>r</sub> (pure number)			
magnetic flux	Φ	weber	Wb	V · s
magnetic flux density	B	tesla	T	Wb/m²
magnetic field strength	H	ampere per metre	A/m	
permeability	μ	henry per metre	H/m	
relative permeability	μ <sub>r</sub> (pure number)			
magnetomotive force	F	ampere	A	
reluctance	R	ampere per weber	A/Wb	
permeance	P	weber per ampere	Wb/A	
length	l	metre	m	
mass	m	kilogram	kg	
time	t	second	s	
force	F	newton	N	kg · m/s²
pressure	p	pascal	Pa	N/m²
frequency	f	hertz	Hz	1/s
angular frequency	ω	radian per second	rad/s	
plane angle	θ	radian	rad	
solid angle	Ω	steradian	sr	

(over)

## Units and Symbols — Continued

Quantity	Symbol	Unit	Symbol	Identical Unit
thermodynamic temperature	T	kelvin	K	
Celsius temperature	t	degree Celsius	°C	
amount of substance	n	mole	mol	
luminous intensity	I	candela	cd	

## Physical Constants<sup>1</sup>

Constant	Symbol	Rounded Value
elementary charge	e	1.6022 × 10 <sup>-19</sup> C
speed of light in vacuum	c	2.9979 × 10 <sup>8</sup> m/s
electric constant	ε <sub>0</sub>	8.8542 × 10 <sup>-12</sup> F/m
magnetic constant	μ <sub>0</sub>	4π × 10 <sup>-7</sup> H/m <sup>2</sup>
Planck constant	h	6.626 × 10 <sup>-34</sup> J · s
Boltzmann constant	k	1.381 × 10 <sup>-23</sup> J/K
Faraday constant	F	9.649 × 10 <sup>4</sup> C/mol
proton gyromagnetic ratio	γ <sub>p</sub>	2.6752 × 10 <sup>8</sup> rad/(s · T)
standard acceleration of free fall	g <sub>0</sub>	9.806 65 m/s <sup>2</sup> <sup>†</sup>
standard atmosphere	atm	101 325 Pa <sup>†</sup>

<sup>1</sup> See General Physical Constants, NBS Special Publication 344, March 1971 (Pocket Card), Price 10¢; \$6.25 per 100.

## Decimal Prefixes

Factor	Prefix	Symbol	Factor	Prefix	Symbol
10 <sup>22</sup>	tera	T	10 <sup>-2</sup>	centi	c
10 <sup>18</sup>	giga	G	10 <sup>-3</sup>	milli	m
10 <sup>12</sup>	mega	M	10 <sup>-6</sup>	micro	μ
10 <sup>9</sup>	kilo	k	10 <sup>-9</sup>	nano	n
10 <sup>3</sup>	hecto	h	10 <sup>-12</sup>	pico	p
10 <sup>1</sup>	deka	d	10 <sup>-15</sup>	femto	f
10 <sup>-1</sup>	deci	d	10 <sup>-18</sup>	atto	a

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